

REMARKS

Claims 1-22 are pending in this application. Claims 23-28 are addend herein.

Claims 1, 7-8, 14-15 and 19 are independent.

Claims 1-22 stand rejected under 35 USC §103(a) as obvious over Hatano et al. (U.S. Patent No. 5,079,184) in view of Sasaki et al. (U.S. Patent No. 6,246,078). The rejection is respectfully traversed.

The traversal arguments filed on January 14, 2002, in response to a prior Official Action, are incorporated herein by reference and reasserted in their entirety. The arguments set forth in the January 14, 2002 response, regarding the failure of the applied prior art to make obvious a p-type window layer doped with zinc, should now be considered with respect to claims 15 and 19, in view of the Preliminary Amendment filed on July 26, 2002.

As detailed in the January 14, 2002 response, the present invention requires a p-type cladding layer (see for example, layer 5a), an insertion layer (such as layer 7a) and a p-type window layer (such as layer 6a). The recited structure prevents the generation of a high potential barrier between the p-type cladding layer and the p-type window layer, thereby lowering the forward voltage between the cladding layer and window layer. As, for example, described on page 16, lines 3-7, of the present application, the forward voltage can be lowered to 1.8V, as compared to the 2.4V forward voltage of a conventional LED.

It is respectfully submitted that, as detailed in the prior response referenced above, the proposed combination of Hatano and Sasaki, even if motivated (which it is respectfully submitted is not the case), lacks any teaching or suggestion of an insertion

layer between a p-type cladding and p-type window layer which has a smaller band gap energy than the p-type cladding layer as required in claims 1, 7-8 and 14. Also lacking is an insertion layer formed between a p-type cladding and a window layer (or in the p-type cladding), which is lattice matched with and has a lower composition of Al than the p-type cladding layer and has a higher composition of Al than an active layer.

In the final Official Action of March 27, 2002, the Examiner responds to the traversal arguments submitted in the January 14, 2002 Request for Reconsideration. In this regard, the following is offered.

In paragraph 5 of the final Official Action, the Examiner, as understood, asserts that if there is any aluminum of layer 47 of Hatano (which the Examiner contends is an insertion layer), the band gap is greater than the active layer 45 of Hatano because layer 45 has no aluminum. The Examiner's conclusion is not understood.

Claim 1, for example, requires that the insertion layer have a smaller band gap energy than the p-type cladding layer, not the active layer. Furthermore, as for example shown in Figure 4 of the present application, which includes an insertion layer with a smaller band gap energy than the p-type cladding layer, both the insertion layer and active layer may include Al.

The Examiner also continues to assert that the layer 47, which the Examiner contends corresponds to the required insertion layer, and p-clad layer 46, which the Examiner contends corresponds to the p-type cladding of the present claims, are lattice-matched as required by independent claims 15 and 19. However, the Examiner fails to provide any support for the asserted conclusion. Accordingly, the conclusion must necessarily be based on facts within the personal knowledge of the Examiner.

Thus, pursuant to 37 CFR §1.104(d)(2), it is respectfully requested that the Examiner issue an affidavit in support of the asserted conclusion.

In paragraph 7 of the final Official Action, the Examiner contends that the traversal arguments submitted in the January 14, 2002, Request for Reconsideration were addressed to features not included in the claims. However, the Examiner does not identify which traversal arguments. Accordingly, the Examiner's position is not clear.

To the extent the Examiner maintains the rejection, it is respectfully requested that the Examiner identify, with specificity, which of the previously submitted traversal arguments are viewed as relating to features not recited in the pending claims.

With regard to paragraph 8 in the final Official Action, it appears that the Examiner has misunderstood the point of the arguments submitted in the January 14, 2002 response.

To clarify, the Examiner proposes to modify the Figure 3 structure in Hatano by adding a window layer as taught by Sasaki. As can be best understood, the Examiner contends it was obvious to modify Hatano's Figure 3 structure to include the window layer of Sasaki (as described with reference to Figures 3a and 3b).

However, as discussed in the January 14, 2002 response and described in detail in the present application, the claimed invention has the objective of avoiding a high potential barrier between the p-cladding layer and the window layer. Hatano does not include a window in the Figure 3 embodiment. Accordingly, Hatano has no need to even consider this problem in connection with this embodiment.

Sasaki, on the other hand, has recognized this potential problem. However, Sasaki attempts to solve the problem in an entirely different manner than that claimed in the present application.

Accordingly, it is respectfully submitted that the proposed combination is inconsistent with Sasaki's own teachings. Further, it is entirely unclear, in view of Sasaki's teachings, that even if Hatano's layer 47 were to correspond to the insertion layer recited in the present claims (which it is respectfully again submitted is not the case), it is entirely unclear how one could combine Sasaki's window layer, and associated structure which Sasaki discloses as necessary to avoid a high potential barrier between the p-cladding layer and window layer, with the Figure 3 structure in Hatano to result in the presently claimed invention. The Examiner has failed to provide any insight as to how such a combination could be made or the results of such a combination.

Hatano does disclose an LED in Figure 8. However, this embodiment is not relied upon in support of the rejection. As the Examiner apparently recognizes, this embodiment is clearly distinguishable from the present claims.

In paragraph 9 of the final Official Action, the Examiner, as can be best understood, contends that traversal arguments relating to claim 4 submitted in the January 14, 2002 response argued that Hatano failed to show an active layer with aluminum.

However, the traversal arguments are directed to the rejection of claims 4 and 11. The claims recite limitation on the range of the concentration of carriers in the p-

type insertion layer. It is again respectfully submitted that the limitations of claims 4 and 11 as well as 18 and 22 have been ignored.

More particularly, the Examiner relies on text in column 6, line 10, of Hatano as disclosing a carrier concentration. However, the referenced text discloses impurity concentration and there is nothing in the applied art which the Examiner has identified that discloses a correspondence between the impurity concentration described and a carrier concentration.

Furthermore, the Examiner while rejecting claims 7 and 14, which require an active layer which includes Al, acknowledges in paragraph 5 of the final Official Action, that the active layer in Hatano "has no Al". Accordingly, the rejection of claims 7 and 14 (as well as that of claims 8, 15 and 19) is inconsistent with the applied arts own teachings, since these claims require that the active layer include Al.

The Examiner has also failed to identify where within Sasaki the window composition required in claims 7 and 14 is to be found.

Claims 15 and 19 require that the p-type window layer be doped with zinc. The Examiner has failed to identify any disclosure within Sasaki which describes such a doped window layer.

Claims 17 and 21 require that the p-type cladding layer be doped with zinc.

The Examiner acknowledges that Hatano's p-type cladding layers are doped with Mg, not Zn. The Examiner asserts that Sasaki discloses a p-type cladding layer which is doped with zinc, and contends it would be obvious to substitute such Sasaki's zinc doping for the Hatano p-type cladding layer.

One can only ask what would make this obvious. Since the Examiner has not provided any objective evidence of such obviousness, the conclusion must necessarily be based upon facts within the Examiner's knowledge. Accordingly, once again an affidavit under 37 CFR 1.104(d)(2) is respectfully requested from the Examiner in support of the rejection.

New claims 23-28 add further limitations not previously recited in the claims. Support for the recitations can be found, for example, on page 16, lines 3-7, of the present application. It is further respectfully submitted that these new claims further and independently distinguish over the applied prior art.

For example, as discussed in the above referenced text, the insertion layer can be used to lower the forward voltage from the 2.4V of a conventional LED to 1.8V. In this regard, Hatano discloses that the low voltage obtainable with the Figure 3 Hatano structure is 2.1V. The addition of a window (as proposed by the Examiner) will typically result in an increase in this voltage,

In view of the foregoing, it is respectfully submitted that the application is in condition for allowance and an early indication of the same is courteously solicited. The Examiner is respectfully requested to contact the undersigned by telephone at the below listed local telephone number, in order to expedite resolution of any remaining issues and further to expedite passage of the application to issue, if any further comments, questions or suggestions arise in connection with the application.

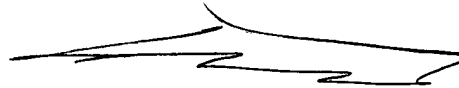
To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the

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